A FIELD TRIAL WITH THE ORGANOPHOSPHORUS INSECTICIDE OMS-1424 AGAINST *CULEX PIPIENS FATIGANS* IN JAKARTA, INDONESIA

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A B S T R A C T

Racun serangga yang tergabung dalam senyawa organofosfor (OMS – 1424) 1(satu) ppm telah dicoba untuk membrantas Culex pipiens fatigans Racun serangga tersebut ternyata efektif, selama kurang lebih dua minggu dibandingkan dengan daerah yang tidak disemprot. Percobaan dilakukan di daerah yang padat penduduknya seluas satu kilometer persegi di Jakarta.

INTRODUCTION

OMS-2 or fenthion, was proved to be effective for *Culex p. fatigans* control in Rangoon by Graham et al., (1972). The WHO Research Unit at Dar-es-Salaam found that OMS-971 or chloropyrifos was more effective than fenthion in *Culex p. fatigans* control (Bang et al., 1975). In the present studies, the effectiveness of OMS-1424, [4] or pirimiphos methyl, was tested against *Cx. p. fatigans* in polluted breeding sites in Jakarta, as part of the WHO Programme for the Evaluation and Testing of New Insecticides.

STUDY AREA

The main trial was carried out in Rawa Kerbo, a middle-income crowded residential section of eastern Jakarta. Nelson et al., (1976) described this area which is inhabited by 20,000 people living in about 4,000 houses. In the same area field trials of insect growth regulators, i.e. OMS-1697, OMS-1804 and OMS-1390, were carried out during the period 1974 to 1976, (Nelson et al, 1976; Self et al., 1976 and Suzuki, et al., 1978).

Briefly, the one kilometer treated area was shaped like a circle. A 30 ha evaluation zone in the centre of the treated area was also circular, and no collection site was closer than 250 metre from the periphery of the treated area. The 70 ha outer ring zone of the treated area served as a barrier zone.

Approximately 20 % of the evaluation and barrier zone consisted of grassy fields and a cemetery where larviciding was not necessary. The sprayable water surface was approximately 2 ha, being about 2 % of the total area.

The main larval habitats of *Cx. p. fatigans* in Rawa Kerbo were cemented or earthen drains along the road and ground pools back of the houses. Other common sites were underground drains and water-cress field, normally inhabited by *Cx. tritaeniorhynchus.*

Kepu, an area similar to and 4 km northwest of Rawa Kerbo, was used as an untreated comparison area.

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4) OMS-1424: O.O. – dimethyl O– (2-diethylamino-4-methylpyrimidin-6-yl)–phosphorothioate. The sample was manufactured by ICI Plant Protection Ltd., UK.

Prior to the main trial, a preliminary test was made in concrete and earthen drains of Rawa Sari, which is located 2 km south-west of Rawa Kerbo.

TREATMENT

In the preliminary test, the depth, width and length of drains were measured and emulsion of OMS-1424 prepared from 50 % emulsifiable concentrate was sprayed to 14 drains with Hudson compression sprayers, so as to give 1 ppm (4 drains), 0.3 ppm (5 drains) and 0.1 ppm (5 drains) of the active ingredients to the volume of water. The treatment was made on 5 October 1976.

In the main trial, 0.5 % emulsion of OMS-1424, prepared from the 50 % emulsifiable concentrates was sprayed to all the positive and potential breeding sites in the area, with the target dosage of 1 ppm of the active ingredients.

Five spray teams (totally 10 men) with supervisors sprayed the 1 km2 trial area. Hudson compression sprayers with adjustable cone nozzles dispersed the emulsions. About 2.3 kg active ingredients were applied. The treatment was made during the period 26 to 28 October 1976.

EVALUATION METHODS

In the preliminary test, twenty dips were made in each of the treated drains. Rough counts of I–II instar larvae, III–IV instar larvae and pupae were made at the spot with the interval of 1 to 4 days till 17 days after the treatment. The mean number of the larvae and pupae was compared with the pre-control counts.

In the main trial, the following pre-control and post-control surveys were made in the treated area as well as in the untreated comparison area, although the frequency or the intensity of the surveys was less in the latter than that in the former.

For surveys of aquatic stages, twenty dips were made in each of eight fixed sites in the 30 ha inner protected area. Rough counts of I–II instar larvae, III–IV instar larvae and pupae were made at the spot. For adult collection of human bait, each of six scouts collected all mosquitoes landing on their bared lower legs from the verandahs of three houses for one hour at each house. Collections were made from 19.00 to 22.00 hours, resulting in 18 man-hours each night. The ovaries of all empty and freshly fed females were removed and dried on glass slides, and the parous condition determined by the tracheolar method.

Adult indoor resting collections were made from 08.00 to 10.00 hours. Six scouts spent 15 minutes in each of eight houses for a total of 12 man-hours per day. The parous rate was also determined for resting mosquitoes.

RESULTS AND DISCUSSION

In the preliminary test, larvae decreased suddenly one day after the treatment, but a considerable number of pupae were still found. The number of pupae reached a minimum level of 0.04 on day 3 (1 ppm) and of 0 on day 6 (0.3 ppm and 0.1 ppm) (Table 1) Total number of immatures per dip was minimum on day 3, being about 0.7 % of the pre-control mean in the 1ppm application, 10 % in the 0.3 ppm and 11 % in the 0.1 ppm application. Thereafter it increased gradually, and reached or exceeded 50 % of the pre-control mean on day 13 in 1 ppm, and on day 8 in 0.1 ppm. In 0.3 ppm application it reached 40 % of the pre-control mean on day 13, but decreased thereafter.

In the main trial, all larvae disappeared by day 3, and only a very few pupae remained. Thereafter. I–II instar larvae began to appear on day 6, with a very few III–IV instar larvae. Pupae reappeared on day 8. On day 15, the relative density of larvae and pupae was 31 % and 76 % of the pre-control mean, respectively (Table 1).

Table 1. Immature Stages Of *Culex P. Fatigans* Collected in Drains Before and After Treatment With 1PPM OMS-1424.

Date (1976)	Day after treatment	Average number per dip		
		I–II instar larvae	III–IV instar larvae	Pupae
Treated area (OMS-1424) – Rawa Kerbo				
19 – X	–	131	55	23
22 – X	–	53	54	20
25 – X	–	64	101	36
29 – X	3	0	0	0.04
1 – XI	6	0.9	0.01	0
3 – XI	8	4	2	0.3
5 – XI	10	19	6	2
8 – XI	13	21	26	5
10 – XI	15	35	13	20
12 – XI	17	17	28	9
16 – XI	21	8	9	7
17 – XI	22	5	4	4
18 – XI	23	40	18	4
23 – XI	28	56	46	5
25 – XI	30	34	22	6
30 – XI	35	46	39	30
3 – XII	38	50	36	17
Untreated area – Kepu				
14 – X	–	13	4	0.4
21 – X	–	18	18	5
11 – XI	(16)	14	11	5
17 – XI	(22)	6	3	2
24 – XI	(29)	15	14	3
1 – XII	(36)	7	5	3

After OMS-1424 treatment in the main trial, no significant change was observed in mosquito density by landing collection or in their proportion parous (Table 2). The mosquito density in resting collection showed no reduction either, but their proportion parous after 6 days and 9 days of the treatment was higher (30 %), compared to the pre-control level. No change in mosquito density was probably due to long dispersal of *Culex p. fatigans* compared to the rather small trial area.

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Table 2. OMS-1424 Trial : Attraction to Human Bait By Female *Culex P. Fatigans.* Six Scouts Each Collected From Verandahs of Three Houses, One Hour per House, From 19.00 Until 22.00 Hours.

Date (1976)	Day after treatment	Females per man hour	Proportion parous	Number dissected
Treated area (OMS-1424) – Rawa Kerbo				
13 – X	–	18.8	0.40	30
21 – X	–	8.2	0.16	50
1 – XI	6	7.3	0.07	30
4 – XI	9	5.7	0.20	50
8 – XI	13	9.1	0.08	40
11 – XI	16	19.4	0.18	50
17 – XI	22	17.4	0.15	52
24 – XI	29	2.8	0.38	40
Untreated area – Kepu				
7 – X	–	7.4	0.25	56
19 – X	–	3.6	0.15	41
3 – XI	(8)	5.4	0.17	30
10 – XI	(15)	7.9	0.20	50
18 – XI	(23)	5.7	0.18	33
25 – XI	(30)	1.9	0.50	20

Table 3. OMS-1424 Trial : Indoor Resting Collections Of *Culex P. Fatigans.* Six Scouts Each Collected From 12 Houses, 15 Minutes per House, From 07.00 Until 10.00 Hours.

Date (1976)	Day after treatment	Females per man hour	Proportion parous	Number dissected
Treated area (OMS-1424) – Rawa Kerbo				
11 – X	–	41.7	0.21	14
18 – X	–	24.5	0.07	27
29 – X	3	17.5	–	–
1 – XI	6	31.3	0.30	30
4 – XI	9	15.6	0.30	30
8 – XI	13	20.1	0.14	21
11 – XI	16	57.8	0.13	30
16 – XI	21	51.5	0.10	30
23 – XI	28	19.4	0.24	25
Untreated area – Kepu				
13 – X	–	21.8	0.32	38
20 – X	–	30.2	0.07	29
2 – XI	(7)	13.1	0.50	20
9 – XI	(14)	37.3	0.24	21
15 – XI	(20)	31.5	0.19	16
22 – XI	(27)	11.9	0.33	27

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